

Remarks

With this Response, claim 1 is amended; claims 17-28 are canceled; and new claims 29-30 are added. Upon entry of these amendments, claims 1-16, 29, and 30 are pending.

It is respectfully submitted that the amendments to claim 1 is fully supported by the application as originally filed (discussed below) and does not present new matter.

Applicant respectfully requests reconsideration and allowance of the application in view of the above claim amendments and following remarks.

Claim Rejections - 35 USC § 103

Claims 1-6, 8-12, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,846,335 Maekawa et al.

In the Office Action, the Examiner asserts that the processing steps of the Maekawa et al. reference are identical to those recited in claim 1 and that the recited parameters for the polished surface are reasonably expected within the teaching of the Maekawa et al. reference. Independent claim 1 is currently amended to distinguish the processing steps recited in claim 1 from the process disclosed by the Maekawa et al. reference. Specifically, claim 1 is amended to recite a method for reducing the size of microscratches in a substrate surface having abrasive particles leftover from a planarization process. The method includes first removing a substantial portion of the leftover particles and then providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles to provide a polished surface. Specifically, the step of providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles is performed after leftover abrasive particles are removed from the substrate. Support for this amendment can be found at page 14, lines 11-13, of the Specification as originally filed.

The process disclosed by the Maekawa et al. reference, as explained at column 9, lines 14-50, starts with a first polishing process that is performed with an abrasive solution. Next, a first cleaning process is performed by scrubbing the wafer with a brush to remove residual particles. A second cleaning process is then performed to remove the remaining particles by cleaning the substrate as described respect to Figure 3. Referring to Figure 3 of the Maekawa et al. reference, a polishing cloth "CL" having micropores "h" is shown. The micropores "h" have

edges “e” that scrape particles “p” from a surface of a semiconductor wafer 1 as the polishing cloth “CL” and semiconductor wafer 1 are moved relative to each other. The origin of the particles “p” is the above noted previous polishing process as explained at column 9, lines 27-33 of the Maekawa et al. reference. Nowhere does the Maekawa et al. reference disclose or suggest providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles after leftover abrasive particles are removed from the substrate to polish the substrate. The only polishing processes described in the Maekawa et al. reference use an abrasive liquid (see column 9, lines 14-26, for example) or use the actual particles that are being cleaned to cause the polishing (see column 10, lines 5-7, for example). Therefore, because the Maekawa et al. reference does not disclose or otherwise suggest providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles after leftover abrasive particles are removed from the substrate to polish the substrate as presently claimed in claim 1, claim 1 is patentable over the Maekawa et al. reference.

Additionally, claims 2-6, 8-12, 15, and 16, which depend from claim 1, are believed patentable over the Maekawa et al. reference. Because claims 2-6, 8-12, 15, and 16 depend from claim 1, these claims also recite providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles after leftover abrasive particles are removed from the substrate to polish the substrate. The Maekawa et al. reference is deficient as to this aspect of claim 1 and the dependent claim of claim 1 believe patentable for at least this reason. Withdrawal of the rejection of record of claims 1-6, 8-12, 15, and 16 as being unpatentable over the Maekawa et al. reference is respectfully requested.

Claims 1-10, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sotozaki et al. (U.S. 6,494,985).

In the Office Action, the Examiner asserts that the processing steps of the Sotozaki et al. reference are identical to those claimed and that the recited parameters for the polished surface are reasonably expected within the teaching of the Sotozaki et al. reference. As discussed above, independent claim 1 is currently amended to recite that the step of providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles is performed after leftover abrasive particles are

removed from the substrate. The Sotozaki et al. reference describes a polishing process at column 8, lines 19-50 that includes main polishing and finish polishing. The main polishing uses an abrasive liquid to polish a substrate. Next, finish polishing (referred to as water polishing) is used to provide additional polishing and simultaneously remove ground off particles and leftover abrasive particles remaining on the wafer surface from the main polishing step. The Sotozaki et al. reference does disclose or suggest providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles after leftover abrasive particles are removed from the substrate to polish the substrate. The Sotozaki et al. reference only discloses removing such leftover particles during a water polish step. Therefore, because the Sotozaki et al. reference does not disclose or otherwise suggest providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles after leftover abrasive particles are removed from the substrate to polish the substrate as presently recited in claim 1, claim 1 is patentable over the Sotozaki et al. reference.

Additionally, claims 2-10, 13, and 14 which depend from claim 1, are believed patentable over the Sotozaki et al. reference. Because claims 2-10, 13, and 14 depend from claim 1, these claims also recite providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles after leftover abrasive particles are removed from the substrate to polish the substrate. The Sotozaki et al. reference is deficient as to this aspect of claim 1 and the dependent claims of claim 1 believe patentable for at least this reason. Withdrawal of the rejection of record of claims 1-10, 13, and 14 as being unpatentable over the Sotozaki et al. reference is respectfully requested.

Dependent claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sotozaki et al. (U.S. 6,494,985) in view of Han et al. (U.S. 6,583,953).


Because claims 15 and 16 depend from claim 1, these claims also recite providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles after leftover abrasive particles are removed from the substrate to polish the substrate. The Han et al. reference is relied on to teach magnetoresistive devices and does not disclose providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without

application of abrasive particles after leftover abrasive particles are removed from the substrate to polish the substrate. Accordingly, claims 15 and 16 are believe patentable for at least the same reason as claim 1 as discussed above.

Conclusion

In view of the above remarks, it is respectfully submitted that the foregoing is fully responsive to the outstanding Office Action. In the event that a phone conference between the Examiner and the Applicant's undersigned attorney would help resolve any issues in the application, the Examiner is invited to contact said attorney at (651) 275-9813.

Respectfully Submitted,

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Dated: 2 DECEMBER 2005